

1 changes within the meaning and range of equivalency of the claims are to be embraced
2 within their scope.

3 What is claimed and desired to be secured by United States Letters Patent is:
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1 1. A downhole repeater assembly comprising:

2 a cylindrical housing, characterized by a proximal end and a distal end, having a
3 substantially cylindrical wall, the cylindrical wall defining a central bore passing
4 therethrough;

5 the cylindrical housing further formed to define at least one recess in the cylindrical
6 wall;

7 a repeater circuit located within the at least one recess;

8 the cylindrical housing further comprising an annular recess formed into at least one
9 of the proximal end and the distal end; and

10 an annular transmission element located in the annular recess, the annular
11 transmission element operably connected to the repeater.

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13 2. The downhole repeater assembly of claim 1, further comprising a first channel, formed
14 within the cylindrical housing, extending from the at least one recess to at least one of the
15 proximal and distal end.

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17 3. The downhole repeater assembly of claim 1, wherein the annular transmission element
18 inductively converts electrical energy to magnetic energy.

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20 4. The downhole repeater assembly of claim 1, wherein the annular transmission element
21 comprises an electrical contact to transmit electrical energy directly to another contact.

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23 5. The downhole repeater assembly of claim 1, further comprising at least one battery
24 located in the at least one recess.

1 6. The downhole repeater assembly of claim 1, wherein:

2 the cylindrical housing is inserted into the bore of a host downhole tool; and

3 the host downhole tool further comprises a pin end and a box end, the pin end having
4 an external threaded portion and the box end having an internal threaded portion.

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6 7. The downhole repeater assembly of claim 6, wherein the box end lacks an integrated
7 secondary shoulder.

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9 8. The downhole repeater assembly of claim 7, further comprising a secondary shoulder
10 insert inserted into the box end, independent from the box end, capable of absorbing stresses
11 normally incident on an integrated secondary shoulder.

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13 9. The downhole repeater assembly of claim 8, wherein stresses normally incident on a
14 secondary shoulder are not imposed on the cylindrical housing.

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16 10. The downhole repeater assembly of claim 8, wherein surface characteristics of the
17 secondary shoulder insert engage corresponding surface characteristics of the inside diameter
18 of the host tool to transfer a load, incident on the secondary shoulder insert, to the host tool.

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20 11. The downhole repeater assembly of claim 1, wherein the repeater circuit further
21 comprises a data acquisition circuit to acquire data from at least one sensor.

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23 12. The downhole repeater assembly of claim 11, wherein the at least one sensor is selected
24 from the group consist of a pressure transducer, an inclinometer, a thermocoupler, an
25 accelerometer, an imaging device, and a seismic device.

1 13. The downhole repeater assembly of claim 1, wherein the repeater circuit further includes
2 components selected from the group consisting of signal filtering circuitry, signal error
3 checking circuitry, device control circuitry, a modem, a digital signal processor, and a
4 microcontroller.

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1 14. A downhole module comprising:

2 a cylindrical housing, characterized by a proximal end and a distal end, having a
3 substantially cylindrical wall, the cylindrical wall defining a central bore passing
4 therethrough;

5 the cylindrical housing further formed to define at least one recess in the cylindrical
6 wall;

7 a repeater circuit located within the at least one recess; and

8 a data acquisition circuit located within the at least one recess, connected to the
9 repeater circuit, to acquire data from at least one sensor.

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11 15. The downhole module of claim 14, further comprising an uphole data link extending
12 from the repeater circuit to the proximal end, and a downhole data link extending from the
13 repeater circuit to the distal end.

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15 16. The downhole module of claim 14, wherein the cylindrical housing is characterized by at
16 least one annular recess formed into at least one of the proximal end and the distal end.

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18 17. The downhole module of claim 16, wherein the cylindrical housing further comprises an
19 annular transmission element located in the annular recess.

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21 18. The downhole module of claim 14, further comprising at least one battery located in the
22 at least one recess.

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24 19. The downhole module of claim 14, wherein the at least one sensor is selected from the
25 group consisting of a pressure transducer, an inclinometer, a thermocoupler, an
26 accelerometer, an imaging device, and a seismic device.

1 20. A downhole repeater assembly comprising:
2 a cylindrical housing, characterized by a proximal end and a distal end, having a
3 substantially cylindrical wall, the cylindrical wall defining a central bore passing
4 therethrough;
5 the cylindrical housing having at least one recess formed into the outer rounded
6 surface of the cylindrical wall; and
7 a signal repeater located within the at least one recess.
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